of human anatomy at Rome. Shortly afterwards he concentrated his attention on the development and anatomy of the Salpidæ, discovering many new organs. His first paper on this group appeared in 1875, and his last is in proof. Todaro also published papers on the fertilisation and segmentation of *Seps chalcides*. Being the first to advocate the introduction of gymnastics in Italian schools, he was elected president of the Italian Gymnastic Federation, in which capacity he delivered several inaugural discourses at meetings and reunions.

Among the many skippers and hunters of northern Norway who have taken part in Arctic exploration one of the best known was Hans Christian Johannessen, whose death at Tromsö at the age of seventy-four is announced by the *Times*. During his sealing and walrus-hunting in the Barents Sea Capt. Johannessen many years ago visited the little-known Wiche Islands to the east of Spitsbergen and the coasts of North-east Land. At a later date he hunted off Novaya Zemlya and Franz Josef Land, penetrating westward to White Island and Spitsbergen. But Capt. Johannessen's principal work was in the navigation of the Kara Sea and the opening of a sea route between Europe and Siberia. When Baron Nordenskjöld sailed in the *Vega* in 1878 to do the North-East passage he was accompanied by the small steamer *Lena* under the command of Capt. Johannessen. Without the help of a pilot Johannessen took the *Lena* safely through the difficulties of the Lena delta, and ascended the river for more than 1700 miles to Nyuiskaya, eventually returning to Yakutsk. This was the first steamer to reach Siberia by this route. Johannessen returned overland, and the *Lena* is still in service on the river. Capt. Johannessen piloted many other vessels through the Kara Sea to the Yenisei River. In 1883, in the *Nordenskjöld*, he rescued the crew of the Dutch expedition in the *Varna*, crushed in the Kara Sea. In the *Gjoa*, which he afterwards sold to Amundsen for his North-West passage expedition, Johannessen made many successful hunting expeditions to the Far North.

Dr. Duckworth gives in the September issue of *Man* an account, with a full catalogue of his writings, of the eminent Italian anthropologist, Major-Gen. Ridolfo Livi, whose death on April 12 last was a serious loss to science. Gen. Livi is best known by his great work, "Antropometria Militare," published in 1896–98, which deals mainly with the question of physical development in relation to fitness for military service. He was also author of a manual of anthropometry of wide scope and originality, and of a treatise on domestic slavery in Italy in medieval times. Gen. Livi died at the age of sixty-three, his degrees in medicine and surgery being taken in 1878, when he entered the Army. He served in the African campaign of 1887–88 as well as in the recent war, holding at the time of his death the rank of major-general, to which he was promoted in 1917.

We much regret to announce the death on September 27, at fifty-seven years of age, of Mr. D. H. Nagel, Vice-President and Senior Tutor of Trinity College, Oxford.

Notes.

A special conference has been called together by the Royal Society to consider the future of the International Catalogue of Scientific Literature. The conference held its first meeting at Burlington House on September 28, Sir Joseph Thomson in the chair. The following is the list of delegates:—Sir David Prain, Sir Arthur Schuster, Mr. J. H. Jeans, Prof. H. E. Armstrong, Dr. F. A. Bather, and Dr. P. C. Mitchell, representing the Royal Society; Prof. M. Knudsen, Denmark; M. A. Lacroix, France; Dr. G. van Rijnberk, Holland; Prof. R. Nasini and Comm.-Ing. E. Mancini, Italy; Dr. H. Nagaoka, Japan; Mr. R. Laache, Norway; Baron Alströmer, Sweden; Dr. H. Escher, Dr. M. Godet, and Dr. H. Field, Switzerland; Dr. R. M. Yerkes, Dr. L. E. Dickson, Mr. L. C. Gunnell, and Dr. S. I. Franz, U.S.A.; Sir Henry Hayden and Dr. S. W. Kemp, India; Sir Thomas Muir, South Africa; Sir Edward Parrott, Queensland; Prof. E. W. Skeats, Victoria; Mr. C. B. Rushton, Western Australia; and Prof. A. Dendy, New Zealand. The delegates were the guests of H.M. Government at a dinner at the Carlton Hotel on September 29.

We understand that Mr. Reid Moir, during his investigations of the north-east coast of Norfolk, has made an important discovery in the neighbourhood of Cromer. It appears that a flint-workshop site, apparently of Early Chellian Palæolithic age, occurs at this place at an horizon referable to one of the lower members of the Cromer Forest Bed series. The site, though limited in extent, is very rich in humanly fashioned flints, and Mr. Moir hopes in the near future to exhibit and describe the large number of specimens he has collected.

The Minister of Health has appointed a Committee to investigate and report on the causes of blindness, including defective vision sufficient to impair economic efficiency, and to suggest measures which might be taken for the prevention of blindness. The members of the Committee are:—Mr. G. H. Roberts, M.P. (chairman), Mr. Stephen Walsh, M.P., Mr. N. Bishop Harman, Dr. J. B. Lawford, Mr. G. F. Mowatt, Mrs. Wilton Phipps, Mr. J. H. Parsons (representing the Royal College of Surgeons), Dr. J. Taylor (representing the Royal College of Physicians), Mr. J. C. Bridge (representing the Home Office), Dr. A. Eicholz (representing the Board of Education), Mr. J. S. Nicholson (representing the Ministry of Labour), Mr. W. M. Stone (representing the Scottish Office), Mr. E. D. Macgregor (representing the Ministry of Health), and a representative of the Medical Research

Council (to be appointed later). Dr. R. A. Farrar and Mr. P. N. R. Butcher will act as joint secretaries to the Committee, and any communications should be addressed to them at the Ministry of Health, Whitehall, London, S.W.1.

SIR FREDERICK ANDREWES, professor of pathology in the University of London, will deliver the Harveian oration of the Royal College of Physicians on Monday, October 18, at 4 p.m.

MR. J. D. FRY, lecturer on physics at the University of Bristol, and Mr. A. Hessell Tiltman have been appointed to the scientific staff of the Research Association of British Rubber and Tyre Manufacturers.

THE third annual Streatfeild memorial lecture will be delivered by Mr. J. H. Coste at the City and Guilds Technical College, Leonard Street, E.C.2, on Thursday, October 14, at 4 p.m. The subject will be "The Gases Dissolved in Water." Admission will be free.

Science for September 10 announces that it is proposed to establish in Panama an international institute for research on tropical diseases as a memorial to the late Major-Gen. W. C. Gorgas. Panama has been chosen in view of the fact that Gen. Gorgas's most noteworthy work was accomplished there.

WE learn from the *British Medical Journal* that the Hughlings Jackson lecture of the Section of Neurology will be delivered at the Royal Society of Medicine by Dr. H. Head on October 7 at 8.45 p.m. Dr. Head has chosen as his subject "A New Conception of Aphasia."

THE British Cutlery Research Association has been approved by the Department of Scientific and Industrial Research as complying with the conditions laid down in the Government scheme for the encouragement of industrial research. The secretary of this association is Mr. J. M. Denton, P.O. Box 49, Sheffield.

CERTAIN friends of Mr. W. F. Denning and admirers of his lifelong devotion to astronomy have contributed a sum of about 300*l*. to a fund which has just been established for him. Mr. Denning has been sent 50*l*. to meet his immediate necessities, and the balance remaining in hand has been paid over to Sir Frank Dyson and Col. E. H. Hills in trust for Mr. Denning, with directions to pay him the sum of 50*l*. annually. Should it be necessary, further subscriptions will be raised in order that a payment of this amount may be secured to Mr. Denning as an annuity for life.

THE Cryptogamic Society of Scotland held its first annual gathering since the war on September 21–23 at Perth. Under the leadership of the secretary, the Very Rev. Dr. D. Paul, of Edinburgh, and Mr. Jas. Menzies, of Perth, the society made excursions to Murthly on the first day and to Invermay on the second, where the dominant species found was *Tricholoma saponaceus*; here the dog-stink horn, *Mutinus caninus*, turned up again, having been recorded many years ago, since when it had not been seen; also in the woods, below a fir-tree, the curator of the Perth Museum, Mr. J. Ritchie, was fortunate in finding *Collybia ludius*, Fr., this being a new species recorded for Britain. The last day's excursion was to Methven, where the outstanding species numerically were *Lactareus vellereus* and *Craterellus cornucopoides*.

THE forthcoming general discussion on "The Physics and Chemistry of Colloids and their Bearing on Industrial Questions," which is being arranged jointly by the Faraday Society and the Physical Society of London, has been fixed for Monday, October 25, at the Institution of Mechanical Engineers, Storey's Gate, London, S.W.1. The discussion will be presided over by Sir W. H. Bragg, and it will be introduced by Prof. The Svedberg, of the University of Upsala, who will give a general survey of the subject before discussion is opened in its various branches. Non-members of the above societies desirous of attending the discussion may obtain tickets of admission from Mr. F. S. Spiers, 10 Essex Street, London, W.C.2. The Faraday Society, the Institution of Mechanical Engineers, the Institute of Metals, and probably also the Iron and Steel Institute contemplate holding early in 1921 a joint general discussion on "The Failure of Metals under Internal or Prolonged Stress."

IT is announced that the British Antarctic Expedition, which Mr. John L. Cope has been organising for some time, has left England for its base at Port Stanley, in the Falkland Islands. Other members of the expedition are Capt. Wilkins, Mr. W. T. Bagshawe (geologist), and Mr. M. C. Lester (navigator and surveyor). The *Times* states that from the Falkland Islands the expedition will be taken by a whaling vessel to the Weddell Sea, and there landed on the ice during January. The party hopes to survey hitherto unexplored regions, but no attempt will be made to reach the Pole, the aims of the expedition being purely geographical and biological. At the end of eighteen months or so the party will return to England, by which time a specially built ship and a large aeroplane will be ready for a further expedition, which is expected to be of five years' duration.

A SMALL but interesting exhibition of books, manuscripts, and relics illustrative of the life and work of Gilbert White was held on September 24–25 at the Art Workers' Guildhall, Queen Square, W.C.1. The exhibition concluded the bicentennial celebration of the birth of the Selborne naturalist organised by the Gilbert White Fellowship. A fine series of modern water-colours of Selborne and of Ringmer adorned the walls of the hall. Upon the tables there were laid out for inspection a large number of editions of "The Natural History and Antiquities of Selborne," together with somewhat rare contemporary works upon subjects discussed by Gilbert White. Microscopy also received attention, while living specimens illustrative of the life of the mosquito aroused considerable interest. In an address delivered by Dr. Gilbert White, Bishop of Willochra, North Australia, and great-grandnephew of Gilbert White, reference was made to the life and work of the naturalist as emphasising the value of a study of Nature—a study which opened out a realm of interest and knowledge untouched by changes in human life and environment.

Nature-study for its own sake was comparatively modern; the earliest writers, such as Pliny the Elder and St. Basil, looked towards the marvellous and the utilitarian, while passages by St. Gregory depicting scenery and the beauty of the country were exceptional. Gilbert White inculcated a love of Nature which might be regarded as a revelation of Divine intelligence. With reference to the "Natural History," Dr. White spoke of its many editions, exceeding in number, so it was said, that of any other book excepting the Bible and "The Pilgrim's Progress." Its popularity was continuous and progressive; it illustrated the steady and quiet devotion still being given to the study of Nature.

AT the meeting of the Association of Economic Biologists held at Kew on September 24 the subject discussed was that of immunity to fungus diseases in plants. The president, Sir David Prain, was in the chair. Mr. E. S. S. Salmon dealt with the relation of climatic factors, and directed attention to those cases where immunity broke down under certain weather conditions. His observations showed that the wild hop comprises numerous physiological forms with distinctive "constitutional" characters with regard to mildew, ranging from extreme susceptibility to immunity. The immune forms when grown in the greenhouse remained immune; when grown in the open, with warm, sunny weather, immunity is retained; with low temperatures and lack of sunshine there is a temporary loss of immunity. Climatic factors would appear to influence also the degree of immunity of certain wheats to "rust." Mr. F. T. Brooks spoke on the question of inheritance of disease resistance, and dealt chiefly with the work of Biffen and Armstrong on *Puccinia glumarum*. Although susceptibility and immunity behave as a pair of allelomorphic characters segregating in Mendelian fashion, it was pointed out that the "genetic constitution" of "immune" plants is liable to modification within narrow limits by environmental conditions, so that a family rust-free one year may be slightly affected by rust another season. Rust-resistance in wheat behaves as a simple Mendelian recessive, but there is evidence that resistance to mildew, on the other hand, acts as a dominant character. A brief analysis of the meanings attached to the use of the word "immunity" in plant pathology was made. A *résumé* of a paper by Mr. A. Howard on the importance of soil factors in bringing about epidemics was read. In the discussion Dr. N. L. Britten and Dr. E. J. Butler spoke of conditions in America and India respectively. Members were entertained to tea by the president, and afterwards visited the Botanic Gardens.

AMONG the Turkana tribe in the Sudan, according to a writer in *Sudan Notes and Records* (vol. iii., No. 3), a curious system of recording prowess in war is in force. When a man has killed an enemy a number of incisions are made on the victor's body to record the fact, those on the right side indicating that the victim was a man, those on the left a woman. A hook is inserted in the skin, a portion of which is raised, in which a cut about half an inch long is made. Fat and clay are then rubbed in until the man can endure no further pain. The endurance of this people may be measured by the fact that many of them are covered from waist to shoulder with such marks. It is only on the first occasion when an enemy has been slain that these marks are made, later deeds of valour being left unrecorded.

THE question of the origins of the Babylonian and Assyrian scripts has been again raised by M. G. C. Teloni in an article entitled "L'écriture babylonienne et assyrienne" in *Scientia* (vol. xxviii.) for 1920. After a full review of various speculations, M. Teloni thus summarises his conclusions: "Les théories exposées dans les pages précédentes, et qui sont celles qui prévalent aujourd'hui au sujet de l'origine de l'écriture babylonienne-assyrienne, se rapportent principalement aux monuments d'épigraphie sumériens et sémitiques du bassin de l'Euphrate et du Tigre. Il n'a été, jusqu'à aujourd'hui, examiné au service de cette question que bien peu d'autres inscriptions appartenant au systeme cunéiforme. On peut attendre beaucoup d'un examen approfondi des signes élamites (anciens et modernes), vannico-assyriens et persans; en particulier, le syllabaire élamite, rival du babylonien au point de vue d'antiquité, et le syllabaire persan cunéiforme, dont la dérivation de Babylone apparaît de jour en jour plus contestable, promettant de faire la lumière sur l'histoire générale de l'écriture cunéiforme."

AN account of a remarkable sculpture recently found on a capstone of a dolmen at Déhus, in the parish of the Vale, Guernsey, is given in the September issue of *Man* by Lt.-Col. T. W. M. de Guérin. The figures consist of a face and two hands, with the outlines of a portion of both arms. Below these is a mark possibly representing the girdle so often found on French statue-menhirs. Anthropomorphic figures very similar to that of Déhus are found in France sculptured on the props of the Late Neolithic dolmens of the valleys of the Seine and Oise, and also of Collorgues, in the Department of Gard, while very similar figures have been noticed in the grottoes of Le Petit Morin, Marne, which are believed to date from the Æneolithic period. It is now certain that the cult of the divinity represented by the figures on the Déhus dolmen and the statue-menhir of the Castel lasted from early times in Guernsey, for the second statue-menhir, now standing as a gate-post at the Church of St. Martin, is of much later date than that of Castel. It is one of the largest and best-preserved statue-menhirs in existence, far surpassing in style and execution those of south-eastern France.

SIR JAMES FRAZER in a letter to the *Times* of September 22 gives a further report of the progress of the Mackie Expedition to East Africa conducted by the Rev. John Roscoe. The expedition has been at work among the Banyoro of Lake Albert in the Uganda Protectorate. This tribe or nation is composed of two ethnical strata, the Bahuma, a ruling caste of herdsmen of Hamitic stock, and the Bairu, a subject agricultural peasantry of Bantu stock. The whole life of the Bahuma king is devoted to ceremonial observances of a priestly or magical character for the good of the people, their cattle, and their land. Consequently he is seldom, or never, able to quit the enclosure in which he resides. An interesting custom once was the annual raising of an agricultural peasant to the kingly rank, representing the real king's dead father. After a period of about a week, during which he lived at the tomb of the dead king, treating the royal widows as his own wives and blessing the real king and the country in the name of the dead man, he was taken to the back of the tomb and strangled.

THE report of the director of the New York Aquarium, reprinted from the twenty-fourth Annual Report of the New York Zoological Society, is chiefly concerned with the unsatisfactory condition of the building. Mr. Townsend has our sympathy, but he arouses our interest more by two brief paragraphs. One of these states that the large crayfish of the Columbia River was safely transported alive from California to New York in wrappings of damp paper. The other ascribes the total disappearance of the sea-horse (*Hippocampus hudsonius*) from local waters to the unusually severe winter of 1918. The report describes and illustrates ingenious gravity filters and strainers and air-compressors used when sending fishes by train or ship.

THE Davidson collection of recent Brachiopoda in the British Museum has hitherto been regarded as taking the lead, but, at all events in point of numbers, it is now outclassed by the collection in the United States National Museum, of which Dr. W. H. Dall has lately published an "Annotated List" (Proc. U.S. Nat. Mus., vol. lvii., pp. 261–377). The latter contains more than six thousand specimens, representing 181 different forms, of which thirty-three are here introduced as new. These fall into some fifty genera. The ordinary zoologist will regret to see some apparently inevitable changes in well-known names: thus *Lingula anatina* becomes *L. unguis*, Linn.; *Terebratulina caput-serpentis* having been based on a fossil of different structure, the name *T. retusa*, Linn., must be adopted for the recent species; and Liothyrina gives place to Gryphus. Among interesting facts of distribution are noted the discovery off the Californian coast of two Japanese species, *Terebratulina crossei* and *T. kiiensis*.

AN interesting discussion arises in Dr. N. Annandale's "Observations on 'Physa Prinsepii,' Sowerby" (Rec. Geol. Surv. India, vol. li., p. 50, 1920), as to the cause of extinction of this giant planorbid some time after the intertrappean (late Cretaceous) epoch in India. The genus Bullinus (formerly Bulinus, Adanson), to which this shell is now transferred, survives in Africa, the Malay Archipelago, and Australia, in conditions apparently less favourable than those surrounding the fossil forms in India. Dr. Annandale suggests that exceedingly congenial surroundings led to an overgrowth of the mollusc (which attains 76 mm. in height), and that it was unable to survive any reduction of the luxury that it had long enjoyed.

IN connection with blood-transfusion experiments during the war it was found that severe reactions sometimes followed the intermingling of the blood of certain individuals. Previous work, in which human sera were classified into four groups according to their iso-agglutinating actions, was therefore very useful in determining between which individuals transfusion could safely take place. In a short paper by Mr. J. R. Learmonth (*Journ. Genetics*, vol. v., No. 2) the author has studied the blood reactions of a number of families, and concludes that the iso-agglutinins are inherited, two pairs of Mendelian factors being concerned. But it appears from observations by Bond that iso-agglutinins which are absent from the serum of a given individual may appear after the patient has reacted to a systemic infection. It has been suggested that these serum reactions might be used as a legal proof of illegitimacy.

IN two papers in the *Journal of Genetics* (vol. x., No. 2) Mr. F. L. Engledow deals with the inheritance of the various forms of lateral florets and rachilla in barley and length of glume and grain in a hybrid wheat. A bristly rachilla is dominant to smooth, and it is suggested that the same factor governs the type of hair in other parts of the flower, and may also be concerned with the development of the root-hairs, which would affect the yield. The barleys differ in the form of their lateral florets, six-row and two-row barley differing by a single factor, the heterozygotes being intermediate with some fluctuations in expression. These fluctuations are found to be environmental in origin, and not a case of mosaic inheritance. In a cross between Polish and Kubanka wheat long and short glumes behave as a pair of characters, the F_1 being intermediate. But the interesting result is obtained that in the extracted "longs" the length of glume is reduced by nearly 25 per cent. in comparison with the long-glumed parent, and this shift or modification remains true in the F_3. Similar results were obtained with grain-length, the long grain being reduced by 12·5 per cent. in the extracted F_2's. These two pairs of characters are inseparable in inheritance, length of grain unexpectedly behaving as a maternal character, although it must be partly determined by the character of the endosperm. Possible explanations of these results are discussed.

SOME very fine views of glaciers in Canada occur in Dr. C. D. Walcott's "Geological Exploration of the Canadian Rockies: Field Season of 1919," extracted as a pamphlet from "Explorations and Field-Work of the Smithsonian Institution in 1919." The photograph of the environs of the Mount Lyell Glacier makes a folding plate nearly 3 ft. long, and includes the superb stratigraphical sections of the Mount Forbes and Mons Peak region, where Carboniferous rocks appear on the crests, succeeded downwards by Devonian, Ordovician, and Upper Cambrian strata.

DR. C. D. WALCOTT, in the Middle Cambrian Burgess Shale of British Columbia, has secured a field of remarkable palæontological richness. He remarks (Smithsonian Miscell. Coll., vol. lxvii., No. 6, 1920) that the sponges from this series comprise nearly all the siliceous sponges known to him from the Cambrian strata of America. He mentions the few other known examples described by Matthew, Bornemann, and others, and now adds several new genera and species of monactinellid, hexactinellid, octactinellid, and heteractinellid types. Chancelloria, of which the general form is preserved in spite of the absence of a strong spicular skeleton, upholds Hinde's Heteractinellida as a distinct sub-order. The form of the spicules, with four to seven horizontal rays and one vertical axial ray, is not tetractinellid, while their grouping is not that of the hexactinellid mesh. The previously known imperfect specimens of this sub-order are of Carboniferous age. The spicules in the Burgess Shale are usually preserved as pyrite, like those of the British Protospongia, the glories of which are now much diminished by its rivals.

TEMPERATURES and humidities in the upper-air conditions favourable for thunderstorm development and temperatures over land and sea have been discussed by Capt. C. K. M. Douglas. The results are published as Professional Notes No. 8 by the Meteorological Office. The flight observations were made in the north of France during 1918 in the preparation of reports and forecasts for military purposes. The most marked feature of the observations was the number of instances of an unstable condition above 8000 ft. Every thunderstorm is said to have been associated with a shallow depression or secondary, and many with the arrival of cooler surface-air. Up to a level of 10,000 ft., and possibly above, the higher the humidity the greater the chance of thunderstorms, which are not likely to develop unless there is at least one fairly damp layer as low as 6000 ft. Thunderstorms in our latitudes are not usually severe if the base of the thunder-clouds is above 8000 ft.; the cloud-base is stated to be, as a rule, at about 5000 ft. or 6000 ft. in hot weather, and lower in cool weather. The height of thunder-clouds is said to be very great, the rounded tops attaining 20,000 ft. and the false cirrus 30,000 ft. in hot weather, and 15,000 ft. and 20,000 ft. respectively in cool weather. Thunderstorms are divided into three classes: (A) those due mainly to heated surface-air in fine, sunny weather; (B) those associated with powerful upper currents from south-west, the surface-wind being light and variable or south-easterly; and (C) those associated with very low upper-air temperatures in the south-westerly or north-westerly currents of cyclonic depressions. Detailed observations and weather-maps are given of each class. The whole discussion is full of valuable suggestions which will aid alike the weather forecaster and the aeronaut.

IN the *Bulletin de la Société d'Encouragement pour l'Industrie Nationale* (May–June, 1920) will be found the second part of the experimental study of the quenching of carbon steels by MM. Portevin and Garvin. This study is mainly concerned with the conditions of formation of troostite and martensite. By means of cooling curves the authors claim to have established that the formation of troostite corresponds to a rapid transformation at about 650° C., while that of martensite is due to a relatively slow transformation at a temperature which is generally below about 300° C. The former is rendered evident by a clear break in the curve, the latter merely by a gradual change in direction. It was found possible by choosing a certain rate of cooling to prepare specimens in which both these changes occurred and where the curves showed both types of change. The authors confirm the generally held view that troostite represents the chemically stable mixture of iron carbide and α-iron in a fine state of division, but their results do not throw any fresh light on the constitution of martensite.

A VERY convenient new showroom is being opened by the Cambridge and Paul Instrument Co., Ltd., at the commodious head office into which the firm has just moved at 45 Grosvenor Place, S.W.1. As a nucleus of the fine assemblage of scientific apparatus which is being brought together there, the collection of instruments shown by the company at the Engineering Exhibition at Olympia has been provided with a permanent home. This relates more particularly to industrial apparatus, and one of the most interesting items is the firm's new CO_2 recorder, which is entirely electrical in its principle. It depends for its action on resistance measurements revealing the difference in the rates of cooling of two platinum helices, one exposed to air saturated with water-vapour, and the other to the flue-gases to be tested. The indicating instrument is arranged so as to read direct in percentage of CO_2, and can be at a considerable distance from the gas-chambers. Continuously recording apparatus can be used, or one indicator can be arranged to be plugged on to any one of a number of CO_2 meters. A variety of patterns of both resistance and thermo-electric thermometers and pyrometers are included in the collection, as well as temperature measuring apparatus on other principles, pressure-gauges, measuring microscopes, fuel calorimeters, and electrical testing apparatus.

AN interesting report of tests on a 1500-kilowatt Ljungström steam turbine conducted by Capt. H. Riall Sankey appears in *Engineering* for September 10. The turbine had been in regular service for fifteen months at the date of the test in the works of Messrs. Marshall, Sons, and Co., Ltd., Gainsborough, and was constructed by the Brush Electrical Engineering Co., Ltd., at Loughborough. No overhaul of the turbine or any special preparation was made for the trials. The principal result, corrected to the guarantee figures of 190 lb. per sq. in. stop-valve pressure, 634° F. stop-valve temperature, and 28·75 in. vacuum at the turbine exhaust, was 11·95 to 12·00 lb. of steam per kilowatt-hour, as measured at the switchboard. The result is slightly below the original guarantee, and indicates that there can have been no serious wear of the blading during the period of service of the turbine. The heat supplied per minute per kilowatt ranged from 258·0 to 257·0 thermal units, and the overall efficiency ratio varied from 68·0 to 68·4 per cent.

THE steaming trials of the armoured cruiser H.M.S. *Raleigh* have just been completed on the Clyde, and form the subject of an article in

Engineering for September 24. The cruiser was built by Messrs. William Beardmore and Co., Ltd., from designs prepared in 1915. The leading consideration was suitability for ocean work in any part of the world, so that a large radius of action was necessary. Her overall length is 605 ft., beam 65 ft., and draught 17 ft. 3 in., with a displacement of 9700 tons. The speed of 30 knots at load draught required a shaft-h.p. of 60,000; she carries 1600 tons of oil-fuel and 800 tons of coal. During construction it was decided to increase the power to 70,000 shaft-h.p. Actual trials have been carried out at powers ranging from 3000 to 71,350 shaft-h.p., and at full power a speed of 31 knots was attained. A remarkable feature of the machinery performance (geared turbines) was the fact that at 35,000 shaft-h.p. a speed of 28 knots was measured. The machinery ran remarkably well and the noise of the gearing was not obtrusive.

WE have received from the firm of Mr. Charles Baker, of High Holborn, a classified list of his second-hand scientific instruments. The catalogue is divided into twelve sections, ten of which are devoted to physical and other appliances and instruments, *e.g.* the first contains particulars of apparatus and materials for microscopic work; the third, instruments used by astronomers; and the tenth is devoted to photographic apparatus. Section xi. contains a list of second-hand scientific works, including a number of bound volumes of periodicals which are for sale; while section xii. is a list of instruments which the firm is desirous of purchasing.

SIR J. A. EWING and Sir Joseph Larmor are editing, for publication by the Cambridge University Press in the spring of next year, the scientific papers of the late Prof. Bertram Hopkinson, of whom the volume will contain a memoir. The Cambridge University Press promise for the end of the present year "The Origin of Man and of His Superstitions," by Carveth Read. Portions of the work have appeared in the *British Journal of Psychology*, but they have been extended and largely rewritten for this first appearance in book form.

THE UNIVERSITY OF LONDON PRESS, LTD., announce a book by Dr. E. E. Slosson entitled "Creative Chemistry," the aim of which is to show how indigo and other coal-tar colours are made, and to arouse the interest of its readers in the practical application of modern science and so induce them to give further attention to the subject. Another book to be issued by the same publishers is "The Psychology of the Six Great Periods of Human Life," by Benchara Branford. It will be published in The New Humanist Series.

MR. F. EDWARDS, 83 High Street, Marylebone, has just circulated a finely illustrated Catalogue (No. 405) of Rare and Beautiful Books which is worthy of perusal. Among the six hundred odd works offered for sale we notice a first edition of Gerarde's "Herball," two black-letter editions of Hakluyt's "Principal Navigations, etc.," and a number of scarce gardening books.

Our Astronomical Column.

EPHEMERIS OF PALLAS.—Now that the Nautical Almanac no longer gives the places of the four bright asteroids, an ephemeris of Pallas may be of use. It is from Marseilles Circular No. 389, and is for Greenwich midnight. Perturbations were not allowed for, but the places are corrected approximately by observations during August. Opposition takes place on October 25, when the magnitude is 7·8, but the beginning of October is more favourable for observation owing to the rapid motion southward.

	R.A.	S. Decl.		R.A.	S. Decl.
	h. m. s.	° ′		h. m. s.	° ′
Sept. 29	2 16 24	13 51	Oct. 19	2 3 18	19 33
Oct. 9	2 10 42	16 49	29	1 55 18	21 45

TEMPEL'S PERIODIC COMET.—The Japanese *Astronomical Herald* for June confirms the conjecture that the R.A. of the above comet when detected by Mr. Kudara on May 25 was 22h. 55m. 7s., not 20h. as telegraphed. This is implied in its statement that the time of perihelion passage deduced from the observation was 1920 June 10. It is seldom that an error in a single digit of a message has such serious consequences, which were the loss of two months' observation of the comet in Europe and America. Many observers searched for it, but the error of 30° in the place prevented them from finding it.

ECLIPSE OBSERVATIONS AT MONTE VIDEO.—The National Meteorological Institute of Uruguay has published an attractive volume, illustrated with numerous photographs, dealing with the observations made during the eclipses of December 3, 1918, and May 29, 1919, which were respectively annular and partial there. The co-ordinates of the Central Observatory are 3h. 44m. 51s. W. Greenwich, 34° 54′ 33″ S. The observed contacts, and comparison with those calculated from "Conn. des Temps" data, are as follows:

G.M.T.					Phase	Earlier than calculated time	Notes
	d.	h.	m.	s.		s.	
Dec.	3	1	27	3·07	First contact	11·58	
	3	12	24·34		Second ,,	16·78	
	3	15	29·95		Third ,,	40·33	Uncertain, very cloudy
May	28	22	57	8·21	First ,,	10·00	
	29	0	38	30·05	Second ,,	8·05	

On December 3 clouds prevented observation of Baily's Beads, stars, shadow-bands, etc. The thermometer fell from 20·4° C. before first contact to a minimum of 17·9° C. twenty minutes after mid-eclipse. The other meteorological and magnetic data are carefully recorded, but show no obvious variation due to the eclipses. But on each occasion there was a very distinct improvement in the clearness with which wireless signals from distant stations were received during eclipse—a phenomenon which has been abundantly verified elsewhere.

On December 3 an interesting record of the variation in the general illumination was obtained by exposing slips of sensitised paper to the sky for 1½ minutes at uniform intervals. The result shows a fairly smooth curve, the irregularities being due to clouds. In view of the fact that there will be an annular eclipse of the sun in Scotland next April, many useful hints for observation of the accompanying phenomena may be derived from this volume.